

Claims

- 1           1. A device, comprising:  
2           a means for performing metal organic vapor phase epitaxy (MOVPE) on a surface  
3           of a substrate; and  
4           a means for performing hydride vapor phase epitaxy (HVPE) on the surface of the  
5           substrate.
- 1           2. The device according to claim 40, wherein said device can transition from  
2           MOVPE to HVPE *in situ*.
- 1           3. The device according to claim 41, wherein the substrate does not have to be  
2           removed from the device between MOVPE and HVPE.
- 1           4. The device according to claim 42, wherein the substrate can be maintained at  
2           elevated temperatures during transition from MOVPE to HVPE.
- 1           5. The device according to claim 41, wherein said device can also transition from  
2           HVPE to MOVPE *in situ*.
- 1           6. The device according to claim 44, wherein said device can also transition from  
2           HVPE to MOVPE *in situ*.
- 1           7. The device according to claim 45, wherein the substrate can be maintained at  
2           elevated temperatures during transition from HVPE to MOVPE.
- 1           8. The device according to claim 40, wherein said device can be used to grow a  
2           III-V nitride compound semiconductor onto the surface of the substrate.

1           9. The device according to claim 47, wherein said device can be used to grow GaN  
2 onto the surface of the substrate.

1           10. The device according to claim 48, wherein said means for performing HVPE  
2 comprises a hot wall reactor having a source zone, and  
3 a downstream mixing zone,  
4 wherein TMG can be reached with Hcl in the source zone to form a chlorinated  
5 gallium species, and wherein the chlorinated gallium species can combine with NH<sub>3</sub> in the  
6 downstream mixing zone and directed toward the substrate for deposition of GaN onto the  
7 substrate.

1           11. The device according to claim 48, wherein said means for performing MOVPE  
2 comprises a low pressure horizontal cold-wall MOCVD reactor.